

Application No. 10/069,596  
Amendment dated August 25, 2005  
Reply to Office Action of May 25, 2005

Docket No.: 1131-0463P

**AMENDMENTS TO THE DRAWINGS**

Please substitute two replacement drawing sheets 4/6 and 5/6, enclosed herewith, for original drawing sheets 4/6 and 5/6.

**REMARKS**

This is in response to the Office Action that was mailed on May 25, 2005. Claims 1-11 are cancelled, without prejudice, and new claims 12-15, which correspond to the disclosed second embodiment of the present invention, are added. New claims 12 and 13 recite features formerly recited in claims 1-5 and 10. With respect to claim 14, attention is directed to lines 30-32 on page 19 of the specification. With respect to claim 15, attention is directed to lines 4-6 on page 20 of the specification. No new matter is introduced by this Amendment. Claims 12-15 are pending in the application.

Objection was raised to the drawings. Corrected drawings as required by the Examiner are enclosed herewith. Specifically, Figures 5 and 6 have been corrected to contain the label "Prior Art", in accordance with the discussion in the 'Background of the Invention' section of the specification.

Claims 1, 3, 4, and 6-11 were rejected under 35 U.S.C. §103(a) as being unpatentable over EP 915,244 (Kaneko) in view of US 5,376,610 (Takahata). Claims 1, 3, 4, and 6-11 were rejected under 35 U.S.C. §103(a) as being unpatentable over US 6,463,734 B1 (Tamura) in view of Kaneko and Takahata. Claims 1, 3, 4, and 6-11 were rejected on the ground of obviousness-type double patenting over Tamura in view of Kaneko and Takahata. The rejections are not believed to apply to the claims as amended.

The Examiner concedes that the primary references – Kaneko and Tamura – do not teach the details of the layers in the three-way catalyst used in the Kaneko or Tamura apparatuses. The Examiner had argued, however, that the Takahata reference suggests the three-way catalyst of claims 1, 3, 4, and 6-11.

Takahata discloses some examples of three-way catalysts that have an outer layer thereof containing platinum or palladium and an inner layer thereof containing rhodium. Particularly in Examples 1 and 7 of the reference, the surface layer contains palladium and the inner layer

contains platinum and rhodium. However, the three-way catalysts of the present invention differ from those of Examples 1 and 7 of Takahata, because the surface layer of the present invention contains platinum while the surface layer of the reference catalysts instead contain palladium.

In general, palladium surpasses platinum because it is activated at a lower temperature compared with platinum. However, for purifying hydrocarbons in combustion involving lean air-fuel ratios, palladium is inferior to platinum.

For a three-way catalyst that is provided in an exhaust path of an internal combustion engine operable with *both* a theoretical air-fuel ratio and a lean air-fuel ratio, it is necessary to have sufficient hydrocarbon purifying performance for a lean air-fuel ratio as well as for normal (theoretical) air-fuel ratio. The three-way catalyst of the present invention is significantly superior in this respect to the Takahata catalysts.

Takahata's Example 4 has an external layer containing platinum. However in this catalyst rhodium and platinum are separately contained in an intermediate layer and an innermost internal layer. This differs significantly from the present invention, which has an inner layer mainly containing both rhodium and platinum as noble metals.

The hydrocarbon purification performance of rhodium during a theoretical air-fuel ratio operation and during the transition from a lean air-fuel ratio to a theoretical air-fuel ratio is improved when rhodium is mixed with platinum. However, the hydrocarbon purifying performance of rhodium in the three-way catalyst of Takahata's Example 4 is inferior to that of the catalysts of the present invention, because the catalyst in Example 4 is loaded separately with rhodium and platinum. In addition, the cost of the three-way catalyst of Takahata's Example 4 is higher than that of the present invention because of the three-layer structure of Example 4.

The three-way catalysts disclosed in Takahata are only for purifying hydrocarbons exhausted at engine start-up by means of secondary air. They cannot improve hydrocarbon

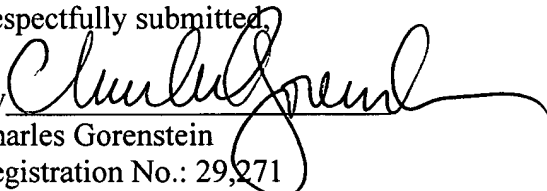
purifying performance during a lean air-fuel ratio operation, or during a theoretical air-fuel ratio operation and a transition from a lean air-fuel ratio to a theoretical air-fuel ratio, as can the three-way catalysts of the present invention.

Takahata fails to teach or suggest any three-way catalyst that has the same structure as the three-way catalysts of the present invention.

Since the three-way catalysts of the present invention are, as discussed above, significantly different from those of Takahata, a construction equivalent to that of the present invention cannot be obtained by following the combined teachings of the prior art. Even if the three-way catalyst of Takahata is combined with the exhaust apparatus disclosed in EP 915,244 or in Tamura, the combination will not provide the functions and effects of the present invention.

The Examiner is respectfully requested to withdraw all rejections and objections of record, and to pass this application to Issue. Should there be any questions, the Examiner is respectfully requested to telephone Richard Gallagher (Reg. No. 28,781) at (703) 205-8008.

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Attachments